SPAWAR Systems Center San Diego

Command 21 "K-Web" Tools

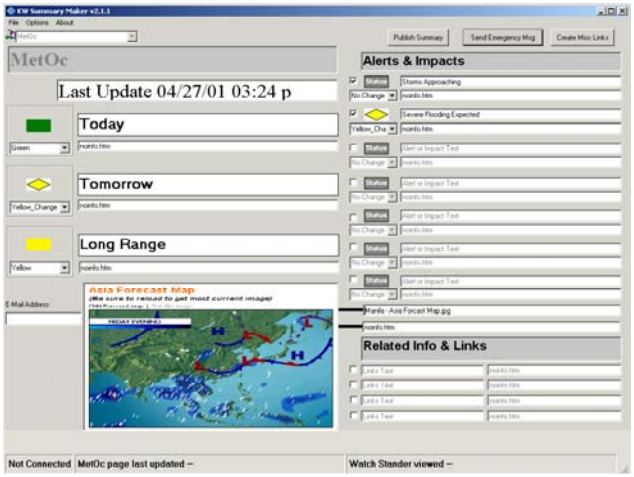

Figure 1. Summary Maker template-based HTML authoring tool.

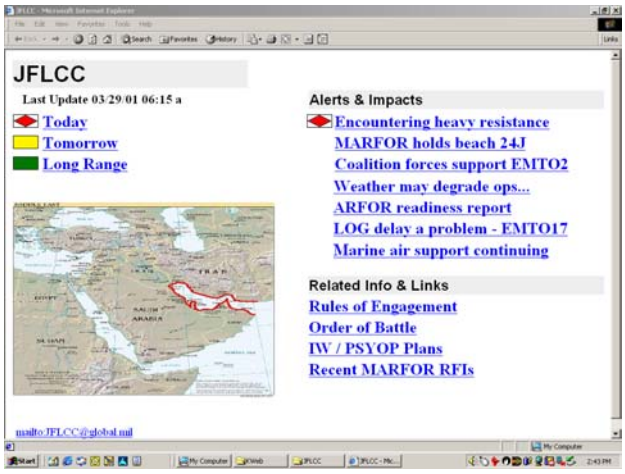

Figure 2. Web-based summary page created by Summary Maker (viewed in Web browser).

The Navy's *Command 21* project, an Office of Naval Research (ONR) sponsored effort currently being conducted at Space and Naval Warfare Systems Center, San Diego (SSC San Diego), is directed at supporting the needs of senior decision makers and support staff in military command centers. As part of that effort, the concept of using Web-based technologies to share operationally relevant information and knowledge has become a central focus. The Command 21 *Knowledge Web* (K-Web) is intended to facilitate group interaction and augment the decision-making capabilities of senior staff by allowing the value-added information (i.e., knowledge) created by staff members to be published into and distributed by a Web.

Requirements Determination. To support the concept of a Knowledge Web, available data and information must be processed, formatted, and stored in such a way that it represents consistent and meaningful information to the consumer(s). Further, since different users may have different levels of experience or training – and almost certainly have different information requirements – the Knowledge Web must be both extremely easy to use and flexible enough to adapt to varying information needs, and yet sufficiently consistent in terms of both format and content that it is easy to navigate and understand. The Command 21 project has created several content authoring tools to address these requirements, which are described below.

Development Process. To develop the Command 21 Knowledge Web tools, a cognitive task analysis (CTA) was first conducted to determine the specific tools and features that military command center personnel require. The findings of this CTA were supported and augmented by the results of several recent studies and analyses conducted in team- and command-level decision-making. These analyses revealed a consistent general requirement for tools to support improved situation awareness / assessment, dynamic synchronous and asynchronous collaboration, as well as adaptive real-time resource and action management and support. Further, a core set of information requirements was identified to support command-level decision-making. These identified user requirements were used as a starting point in the development of information and knowledge development tools.

The Command 21 K-Web tools were developed using an iterative design process. First, the core information requirements identified above were considered. Next, basic design requirements were developed and imposed, and human-computer interface designers developed primitive storyboard concepts. Representative subject matter experts and selected fleet representatives then reviewed these storyboards to determine how well they met identified needs. As necessary, storyboards were reworked and re-evaluated. Once a storyboard concept met with basic approval with regard to function and features, rapid prototyping with testing by users enabled tool refinement.

Summary Maker Authoring Tool. One of the general requirements called out in the CTAs was the need for tools to support improved situation awareness (SA). One way to improve SA among decision makers is to make mission-relevant information easily and rapidly available, and provide it in the appropriate context. Summary Maker (a.k.a. SumMaker) is designed as a basic, template-based, Web page creation tool to facilitate the rapid production and dissemination of standardized summary information for inclusion in a Knowledge Web. The published product of Summary Maker – a basic HTML Summary Page – is used by Information Consumers to acquire and maintain SA.

Information Producers need not know anything about publishing HTML to create Web content using Summary Maker. A flexible template approach is used whereby Information Producers create summaries of mission- or situation-relevant information. These summaries serve two important purposes:.

1) Once published summary pages convey concise, key information that is consistently formatted for Information Consumers;
2) The text and graphics in the summary pages may serve as hyperlinks to more detailed information available within the Knowledge Web.

A number of general purpose templates are provide in Summary Maker. Most of the fields in the templates support drag-and-drop editing. Once published, the HTML-based summaries are made available on the Web using standard Web-hosting software. Because of Summary Maker's inherent flexibility to display or link to virtually any kind of information product, Summary Maker affords the user the ability to provide access to a wide variety of information through a consistently formatted Web page, yet supports unique requirements identified through CTAs.

Figure 1 represents the template view of the Summary Maker tool (version 2.1.1) prior to publishing a product; Figure 2 represents the published HTML product of Summary Maker.

TacGraph Tool. Map-based, highly graphical views of tactical and other data were one of the highest priority information requirements identified in the CTA conducted to establish user requirements. Other kinds of data are also often desired in graphical and map-referenced form. However, this is typically exceedingly time-consuming and laborious with current shipboard tools. TacGraph is designed to address the need to rapidly create graphical Web content annotated with value-added information.

TacGraph (short for **Tac**tically-relevant **Graph**ics Authoring Tool) is designed as an easy-to-use graphical drawing tool customized for use by military personnel. TacGraph is used to rapidly develop summarized, tactically-relevant images and publish them as Web content. TacGraph features imbedded NIMA (National Imagery and Mapping Agency) map data and a number of specialized drawing tools, and produces both Web-standard HTML files and JPEG graphics files. The HTML pages can have additional information associated with any object. Images and text within these files can be made interactive and linked to other Web content within or outside the Knowledge Web. Figure 3 shows TacGraph's spoke-style symbol selection menu. This menu allows users unfamiliar

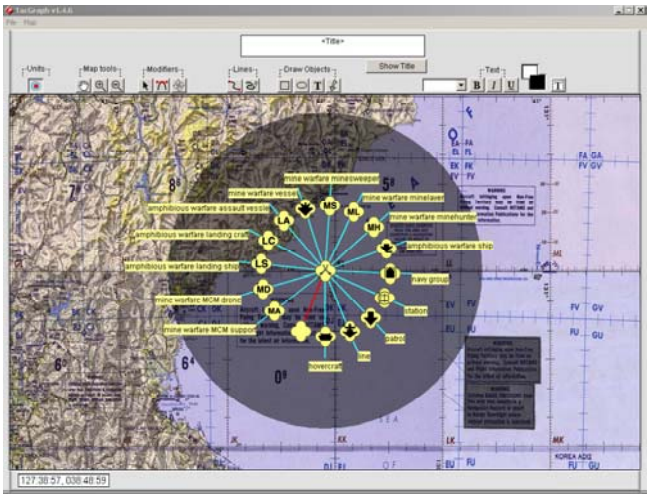

Figure 3. TacGraph spoke-based symbol selection tool.

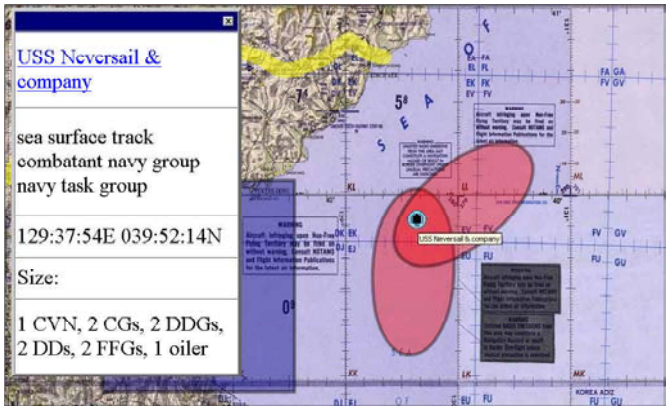

Figure 4. HTML graphic created by TacGraph tool with "drill-down" window (viewed in web browser).

with the 2525B symbol set to rapidly select from among thousands of possible symbol choices. Figure 4 shows a finished TacGraph product as viewed using Microsoft Internet Explorer, with a representative "properties" window showing a hyperlink to other K-Web content as well as other value-added information associated with the selected object. Each of the symbols on the map is an interactive link to information available in the Knowledge Web. Three versions of the TacGraph tool have been created to date containing maps for different regions of the world.

Summary. Using existing Web technologies and designing and developing customized tools to aid the user, the ONR sponsored Command 21 Project has made significant improvements in the development, management, dissemination, use, and understanding of mission-relevant information by command-level decision makers. SSC San Diego has led project efforts to support the needs of senior decision makers and their support staff. The Command 21 Knowledge Web concept represents an evolutionary step towards helping users turn raw data into *meaningful information and knowledge* – and sharing that knowledge with others.

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